

# Geophysics Education in the UK

*Professor Aftab Khan, Leicester University, Peter Maguire, President, and Christine Thomas, Education Secretary, British Geophysical Association*

Geophysics has emerged as an educational subject in its own right. Observations of the Earth's physical properties made in laboratories and observatories, from ships, aircraft and satellites worldwide have led to a revolution in our understanding of how the earth works, its hazards and their mitigation. Technological and computing advances have increased our ability to make refined investigations at depth at a variety of scales ranging from the exploration for the oil, gas, water, and raw materials mankind needs for survival, to the location of archaeological remains and environmental monitoring as well as answering fundamental questions about the physics of the Earth. Excellent first degree courses have been developed in a dozen or so universities to provide increasingly employable graduates. However the number of students reading for a first degree in geophysics has fallen by more than 50% in the last 2 decades even though the total number of students has been rising. This decline is only partly explained by falls of 20 % (mathematics) and 40 % (physics) in the number of students doing A levels in the subjects normally required for entry, while Geophysics MSc courses in Earth Science departments have been reduced for financial reasons from five to one.

This rapid decline stimulated a wide-ranging review into "Geophysics Education" in the UK by the British Geophysical Association (BGA), sponsored by its parent learned Societies, the Royal Astronomical Society (RAS) and the Geological Society of London (GSL). Information is being sought from universities and employers, as well

as past and present students. The initial findings were presented at the Geological Society on April 22nd by members of a Review Committee drawn from the universities, schools, the oil industry, the shallow geophysics community and the public sector. A full report of the on-going review is expected at the end of the year.

The students (40% female) are of excellent quality with an average A-level grade of B in both Physics and Mathematics. Most embarked on the subject because of scientific curiosity without a specific career in mind. They all found their courses highly educative, lively and informative and thoroughly enjoyed their time at University. The oil industry was the most common employer followed by those in IT, private companies, the public sector, the environment, mining, teaching and research. Their responses indicate that the shortage of applicants is due to the lack of awareness in the schools. They found out about geophysics when searching for something exciting to do.

The oil-related companies who responded varied in size from those employing a few geophysics graduates to those with hundreds. The multinationals recruit worldwide so it is important to continue producing high quality graduates in the UK. There is concern in the industry about the future supply of geophysics graduates from the UK. Employers in the non-oil sector include those concerned with the environment, engineering, water, mining, and archaeological applications in which multi-skilled people are required. The relevant skills are usually acquired five years after completing a first degree in Geophysics, which is an ideal

university education as it is broadly based. The base is very fragile at present and there is an urgent need for more R&D to underpin this area of science.

The public sector includes the British Geological Survey, a huge organisation with over 500 geoscientists and a range of thematic programmes requiring geophysicists for 3D investigations on- and off-shore. The Ministry of Defence supports a prestigious research centre on the use of seismology to detect and identify underground nuclear explosions. There are also anxieties about the future supply of graduates in this sector.

There is a danger that the university provision will decline further in response to the fall in applications, the effects of the research assessment exercise (RAE), a halving in the unit of resource, and the declining skills base of the intake. This decline should be arrested and recovery promoted by teaching geophysics in schools nationwide, as demonstrated by enthusiastic physics teachers in two schools that operate seismographs with the aid of Royal Society grants. These enabled them to link up with the "Incorporated Research Institutes for Seismology" Schools' network in the US. Their recordings of the 2004 Boxing Day Sumatran earthquake responsible for the tsunami received wide press coverage. There is a need for workshops to educate teachers on the merits of using earth examples to illustrate basic physics concepts. Geophysics is an admirable way of enthusing pupils to continue with physical science and mathematics to university level for a wide range of degree courses.